

Clean Room Apparel

The people at right are displaying a line of contamination control garments used by hospitals, pharmaceutical and medical equipment manufacturers, aerospace and electronic plants, and other industrial facilities where extreme cleanliness is important. They are produced and marketed by Baxter Healthcare Corporation, Industrial Division, Valencia, California under the trade name Micro-Clean® 212.

The lower left photo is a closeup of the "high top" shoe covers that extend all the way to the knee. At lower right is an open face hood and face mask. At far right is the clean room overall with accessories.

The Micro-Clean 212 garments represent a second generation spinoff, an advancement over an original Micro-Clean line introduced in 1982 and based on NASA contamination control technology.

NASA began developing such technology in the earliest days of the space program because delicate instrumentation and sensitive electronic systems are highly susceptible to breakdown through contamination. A tiny mote of dust, introduced to the equipment during its fabrication, can trigger a malfunction that can at best impair a system's accuracy and precision, at worst cause mission failure.

To bar such occurrences, flight equipment is assembled in clean rooms that match or surpass hospital standards of cleanliness. The air entering these facilities is filtered, temperature and humidity precisely controlled; the rooms are designed to eliminate nooks and crannies where dust particles might collect. Workers wear special lint-free clothing and they enter the clean room through an airlock that prevents contamination from outside air.

To help its contractors set up clean rooms and develop advanced control measures, NASA spearheaded contamination control technology, building an informational base with input





from Marshall Space Flight Center, Johnson Space Center, Kennedy Space Center, Lewis Research Center and Sandia Laboratories. NASA conducted a number of special courses for clean room technicians and supervisors and published a series of handbooks that represented the most comprehensive body of contamination control information available at that time (in the 1960s).

American Hospital Supply Corporation (AHSC), Baxter Healthcare's predecessor company, used the NASA informational base as a departure point for a research project aimed at improving industrial contamination control technology. In 1980, AHSC researchers studied the NASA handbooks, visited NASA centers,

and investigated several contractor clean room operations, acquiring a wealth of information on contamination control technology and problem areas.

This research project concluded that the greatest sources of clean room contamination were the people who worked in such facilities; they generated microscopic body particles that escaped through tiny "windows" in the woven garments they wore.

This conclusion led to AHSC's development of the original (1982) Micro-Clean line of apparel, made of non-woven material known as Tyvek™ capable of filtering 99 percent of all particulate matter measuring half a micron (a millionth of a meter) and larger.

Baxter Healthcare has continued to improve the line through advanced technology. The key improvement in the new Micro-Clean 212 line is a proprietary polyimide coating applied to the base fabric (Tyvek) to seal and tie down any loose fibers, thereby minimizing fabric linting and particle generation from abrasion. The coating also provides greater durability. Additionally, the company redesigned its coverall to minimize the stress points along the seams and make the garment virtually tearproof.

Micro-Clean 212 garments are disposable, which eliminates the costs of laundering and repair. They come in sterile and non-sterile forms; sterilization is by gamma radiation. Each garment is individually packaged in a clean room.

*Micro-Clean is a registered trademark of Baxter Healthcare Corporation.